

As required under 37 C.F.R. 1.121, a clean version of the amended Abstract of Invention is set forth herebelow:

ABSTRACT OF INVENTION

A planar laser illumination and imaging (PLIIM) based camera system capable of producing digital images with reduced levels of speckle-pattern noise. The PLIIM based camera system comprises a planar laser illumination array (PLIA) including a plurality of laser diodes for producing and projecting a planar laser illumination beam (PLIB), so as to illuminate an object as it is moving past said PLIIM based camera system. An image formation and detection (IFD) module is provided having a image detection array and imaging forming optics for providing the image detection array with a field of view (FOV). The PLIB and FOV are arranged in a coplanar relationship along the working range of the PLIIM based camera system so that the PLIB illuminates primarily within the FOV of the IFD module. A speckle-pattern noise reduction subsystem is integrated with the PLIA, for reducing the temporal-coherence of said planar laser illumination beam (PLIB) before the PLIB illuminates a target object. The speckle-pattern noise reduction subsystem carries out a temporal phase modulation technique during the transmission of the PLIB towards the target, so that the object is illuminated with a temporally coherent-reduced planar laser illumination beam (PLIB) and numerous substantially different time-varying speckle-noise patterns are produced at the image detection array over the photo-integration time period thereof. The numerous substantially different time-varying speckle-noise patterns are detected at the image detection array over the photo-integration time period, and the detected speckle-noise patterns are temporally averaged at said image detection array during the photo-integration time period thereof. As a result of such temporal averaging, the RMS power of observable speckle-noise patterns is reduced at the image detection array. By virtue of the present invention, it is now possible to enjoy the benefits of using laser-based illumination during high-speed imaging operations, without the adverse effects associated with speckle-pattern noise.--